

**Random tilings, free boundary problems and the Beltrami equation.**

Kari Astala  
Aalto University

In two dimensions scaling limits of random structures often possess some conformal invariance properties, giving ways to methods of geometric analysis.

In this talk we are interested in configurations of random tilings under scaling limits, and the boundaries between their ordered and disordered (or frozen and liquid) limit regions.

The liquid region carries a natural complex structure, which turns out can be described by a quasilinear Beltrami equation with very specific properties. On the other hand, the boundary of the liquid domain can be identified by a (very degenerate) free boundary problem.

In this talk, based on joint work with E. Duse, I. Prause and X. Zhong, I show how these methods lead to understanding and classifying the geometry of the limiting boundaries for different random tilings and other dimer models.